Chapter 2. Practitioner Services and Patient Characteristics

Introduction

Health care practitioner[1] services received by residents in 1998 totaled $6.2 billion, 36.4 percent of total health care spending in the state.[2] This percentage exceeds the share of expenditures allocated to any other service category, including the 34.1 percent total share for inpatient and outpatient hospital care. From 1997 to 1998, spending on physician services for residents grew by 7.7 percent, exceeding the state's 5.3 percent growth in total health care expenditures. Expenditures for non-physician health care professionals grew by 4.4 percent. The magnitude of expenditures related with practitioner services and the role practitioners have in controlling the consumption of other health care services, such as inpatient care and pharmaceuticals, compels studies into the nature of the services being provided and the associated payments.

The analyses described in this chapter examine utilization data from the Medical Care Data Base (MCDB) grouped according to patient characteristics. Services are separated by payers to present comparisons between the services provided to the **private non-HMO**, **private HMO FFS**, **Medicare non-HMO**, and **Medicare HMO FFS** populations. The first analysis groups the data by age category and reports utilization using the number of services, payments, and work relative value units (RVUs). The second analysis reports the same utilization variable grouped according to the patients' urban status. The final analysis aggregates the number of services according to the patients' medical conditions (diagnoses). Due to inconsistencies between the 1997 and 1998 data base specifications, it is not possible to include trend analyses in this report.

The sources and limitations of the data used for the analyses presented in this and subsequent chapters are outlined in Chapter 1. As described in Chapter 1, the MCDB is the source of all data analyzed in this chapter but excludes some practitioner services. Data missing from the MCDB include all services paid for directly by individuals. Additionally, for the tables in this and the next three chapters, all dental services and HMO capitated services contained in the MCDB have been excluded from the analyses.

Each section of analysis in this chapter begins with observations about the private non-HMO services/patients. The private HMO FFS services, which are a subset of the total practitioner services received by private HMO patients, are principally discussed in contrast to the private non-HMO data. Observations about the Medicare non-HMO services/patients are introduced next with some comparisons to the private non-HMO population. Like the private services, Medicare HMO FFS services are a subset of the

[1] Health care practitioners refers to physicians and other health care professionals, e.g., nurse practitioners, psychologists, and physical therapists. Although dentists are also health care practitioners, dental services have been excluded from the health care service analysis presented in this and in subsequent chapters.

[2] This is the estimated expenditure if public HMO capitation payments are distributed among the service categories in proportions typical of private HMOs in Maryland. Maryland Health Care Commission. *State Health Care Expenditures: Experience from 1998*, Table 3-2, p 26.

total practitioner services received by Medicare HMO patients that are discussed by making comparisons to the Medicare non-HMO data.

Relative Value Units (RVUs)

The tables in this report include work RVUs as a utilization variable. The tables also provide counts and distributions of services. However, some services are much more labor-intensive than others, but simple counts of services do not take this fact into consideration. Work RVUs take into account the average time taken to perform the service, the difficulty of the work, and the level of training and expertise required to perform the work. These factors combined reflect the complexity of service.

The Health Care Financing Administration developed the RVU system for Medicare's physician payment system. The Medicare RVU system uses three different classes of RVUs: work RVUs, office expense RVUs, and malpractice RVUs. The office expense RVUs take into account the typical office expenses incurred in performing the service. These include equipment costs, office support costs, and supplies. The malpractice RVUs take into account the relative risk of malpractice claims for the different services and are quite small relative to the work and office expense RVUs.

Only the work RVUs are used in the RVU tabulations in this report. The following illustrates a comparison of services based on work RVUs. EXAMPLE: Consider three services: A, B, and C. Suppose A has a work RVU value of 1, that B requires the same level of training and intensity as A, but takes twice as long to do, and that C takes the same length of time as A but requires more training. Then, B would be worth 2 work RVUs, and C would be worth more than 1 work RVU—say, 1.2 RVUs.

The Medicare RVU system assigns RVUs only to procedures that are paid by Medicare under the RVU system. These are health professional services that are covered by Medicare and not considered as bundled in the payment for other services. Medicare's system omits over 30 percent of the services included in the MCDB. To compensate for this, the Commission imputed work RVUs for services that do not have RVUs available in the Medicare RVU system, as long as the service was not a physician service or was not covered under Medicare. The Commission did not impute RVUs for those services that were bundled within other services on the assumption that the weight for the other service will implicitly include components for the services that are bundled with it. Twenty-nine percent of the services in the MCDB have imputed weights.

The procedure used to impute weights had the following steps:

1. Accumulate all of the work RVUs for all services with a positive RVU value.
2. Accumulate the allowed charges for all services included in step 1.
3. Divide the total charges from step 2 by the total work RVUs to calculate the average allowed charge per RVU.
4. Calculate the average allowed charge for each service that is to have an imputed RVU.
5. Calculate the relative value for each service in step 4 by dividing the average charge for the service from step 4 by the average allowed charge per RVU calculated in step 3.

Utilization by Age Category and Payer

The number and type of services used varies with the age of the recipient. Table 4 illustrates age-related differences in the average number of services, total payment, and work RVUs per recipient by payer population. For private non-HMOs, the average number of practitioner services per recipient is 13.1 but this varies considerably by age. Only service use by adults 35-44 is close to the non-HMO average. Infants (i.e., age less than 1), with their birth services and frequent check-ups, utilize a relatively high number of services, but service use by those over age 45 is higher with the age group 55-64 having the highest use. Children (ages 1-17) have the lowest service use but young adults (18-34) also rank below average in service use.

The average payment for private non-HMO recipients of practitioner services is $815. The age-related payment pattern mirrors that of service use, but with somewhat greater differences. For example, mean payment for practitioner services in young children is one-half the non-HMO average payment, contrasted with their service use, which is just 37 percent below average. The mean payment for services by those ages 55-64 is 63 percent above average versus a service use that is 53 percent above average. The wider differences for payment result mainly from differences in the complexity of the services provided to the different age groups.

Work RVUs (see text box on page 8) capture the complexity, i.e., duration, difficulty, and level of expertise, that is involved in practitioner services. On average, private non-HMO patients receive 9.84 work RVUs from practitioners, as shown in Table 4. In general, the more services used by an age group the higher its number of work RVUs. However, the relationship between total services and total work RVUs is not a simple one. For example, both younger and older children consume nearly identical numbers of services (8.3 and 8.2, respectively), yet their RVU totals differ by 10 percent with older children having more RVUs at 5.71 than younger children at 5.20. This discrepancy between service use and work RVUs occurs because of a difference in the average intensity of services received by the two age groups.

Service intensity, or the average RVU per service, varies among the age groups. The discrepancy between service use and work RVUs in younger and older children results from the fact that older children tend to receive services that are somewhat more complex, i.e., of higher RVU value compared to younger children. The service intensities for younger and older children are 0.63 and 0.70, respectively. Consequently, although older children use nearly the same number of services as younger children, older children receive more work RVUs. The mean RVUs per service among all private non-HMO is 0.75. The highest service intensities occur in the main childbearing years (18-34), 0.83, and in infants, 0.80. The service intensities for the remaining adults are all near average ages 35-44, 0.77; ages 45-54, 0.74; and ages 55-64, 0.76.

TABLE 4
MEAN NUMBER OF SERVICES, PAYMENTS, AND WORK RVUs
BY AGE GROUP AND PAYER - 1998

Age Group	Private Non-HMO	Private HMO FFS	Medicare Non-HMO	Medicare HMO FFS
MEAN NUMBER OF SERVICES PER RECIPIENT				
Total Age	**13.1**	**7.9**	**34.9**	**14.6**
<1	14.4	10.8		
1-9	8.3	5.8		
10-17	8.2	5.3		
18-34	10.4	6.6		
35-44	13.3	8.2		
45-54	16.6	10.2		
55-64	20.1	12.8		
65-74			31.3	13.9
75+			38.2	15.8
MEAN PAYMENT PER RECIPIENT				
Total Age	**$815**	**$581**	**$1,922**	**$1,187**
<1	975	743		
1-9	406	296		
10-17	439	322		
18-34	699	542		
35-44	845	630		
45-54	1,026	773		
55-64	1,327	1,020		
65-74			1,742	1,153
75+			2,083	1,252
MEAN WORK RVUs PER RECIPIENT				
Total Age	**9.84**	**7.61**	**28.23**	**15.04**
<1	11.55	9.96		
1-9	5.20	3.91		
10-17	5.71	4.42		
18-34	8.58	7.28		
35-44	10.23	8.29		
45-54	12.23	9.83		
55-64	15.37	12.90		
65-74			25.26	14.44
75+			30.88	16.22

The means for services, payment and work RVUs in HMO FFS are below the respective non-HMO averages in every age category. These results must be viewed keeping in mind that the differences between non-HMO and HMO practitioner utilization

presented here are overstated due to the absence of data on HMO services provided under capitation arrangements. Differences in the mean payment per recipient of FFS services compared to the non-HMO averages range from 22 percent less for young adults ages 18-34 to 27 percent less for children. Delivery system differences in work RVUs received are smaller, ranging from 14 percent less FFS-reimbursed work RVUs for infants in HMOs to 25 percent less FFS-reimbursed work RVUs for young children in HMOs. The per unit reimbursement rate is lower in HMO FFS than under non-HMO reimbursement, as would be expected, since reduced payment rates are one source of HMO cost-containment. Mean payment per work RVU for HMO FFS practitioner services at $76 is 8 percent below the $83 mean payment per work RVU for non-HMOs.[3] The age-related utilization patterns observed in non-HMO practitioner services also occur in HMO FFS services, although the size of each age category's percent deviation from the overall mean for each utilization measure is not identical to those in the non-HMO data.

Where service intensity is concerned, however, the mean work RVU per service is higher for HMO FFS services than for non-HMO services, regardless of age. This implies that the subset of HMO services rendered under FFS arrangements tend to be more complex than the overall mix of non-HMO services. The HMO FFS service intensities are infants, 0.92; ages 1-9, 0.67; ages 10-17, 0.83; ages 18-34, 1.10; ages 35-44, 1.01; ages 45-54, 0.96; and ages 55-64, 1.01. The difference in HMO FFS and non-HMO service intensities is smallest for young children at 8 percent greater in HMO FFS, and greatest for young adults at 34 percent greater in HMO FFS. The reason for the relatively greater complexity of the HMO FFS services is likely a result of less complex HMO services being more concentrated in the omitted set of capitated services.

Medicare non-HMO recipients, being elderly, have greater utilization of practitioner services than private non-HMO recipients as shown in Table 4. The average payment for practitioner services in Medicare non-HMO recipients is $1,922, nearly 2.4 times the mean payment for private non-HMO recipients. The non-HMO private-Medicare differences in mean services and work RVUs are even greater. On average, Medicare recipients consume 2.7 times and 2.9 times privately insured recipients' use of services and work RVUs, respectively. There are considerable differences in utilization even when comparing near-elderly adults (55-64) to Medicare recipients ages 65-74, with these Medicare recipients averaging 31 percent higher payments, 56 percent more services, and 64 percent more work RVUs. In comparison, the relative differences in utilization for Medicare recipients age 75 & over compared to the younger Medicare patients are smaller, with increases of 20, 22, and 22 percent in payment, services, work RVUs, respectively. Due to age-related illnesses that increase in severity and services provided to the dying, the service intensity of Medicare non-HMO services, 0.81, exceeds the intensities observed in private non-HMO recipients, excluding young adults (18-34) who receive most of the pregnancy-related services covered by insurance.

[3] Mean payment per work RVU and mean work RVUs per service are not included in any of the tables in this chapter so these values are fully presented within the text.

The means for services, payment and work RVUs in Medicare HMO FFS are below the respective Medicare non-HMO averages. The mean payment per Medicare HMO recipient of FFS services differs from the Medicare non-HMO average by 34 percent for those ages 65-74 and by 40 percent for recipients aged 75 & over. Similar to the privately insured, service intensity is greater for Medicare's HMO FFS services (1.03) versus its non-HMO (0.81) services by 27 percent. Unlike the private insurance sector, delivery system differences in the Medicare work RVUs received by each age category exceed the percent differences in per recipient payments. This occurs because Medicare HMOs' $78.92 average reimbursement per work RVU, is greater than the $68.89 average reimbursement for Medicare non-HMO services by 27 percent. Private sector reimbursement rates have been consistently above those for Medicare.

Table 5 shows the age distribution of patients who received practitioner services through each of the payers. Among privately insured recipients receiving non-HMO services, one fourth are infants and children, about 41 percent are younger adults ages 18-44, and one-third are older adults ages 45-64. The private HMO FFS recipients tend to be younger, with nearly 30 percent under age 18, about 45 percent ages 18-44, and about one-fourth ages 45-64. The differences are most pronounced in infants and young children, which indicates a higher proportion of families with young children among the HMO enrollees compared to non-HMO enrollees. Among Medicare recipients, the HMO FFS recipients are younger than the non-HMO recipients. Those ages 65-74 comprise two-thirds of HMO FFS recipients compared to just 47 percent of the non-HMO patient population. Older Medicare enrollees are less likely to enroll in HMOs than their younger counterparts.

The easiest way to determine if an age group is utilizing more or less than its expected share based on its percentage of patients is to construct a ratio of the service (payment, RVU) distribution percentage to the age distribution percentage for each age group. A ratio **greater than 1** indicates that the age group's share of total services (payments, RVUs) exceeds its expected share based on its relative number of patients. Ratios **less than 1** indicate relative "shortfalls" or instances when the share of services, payments, or RVUs is less than would be expected based on the group's relative numbers. These ratios are presented in Table 5.

Whether in non-HMOs or HMOs, children (ages 1-17) account for proportionately less services, payments, and work RVUs than their number of patients. Children are the least expensive age group to provide with practitioner services. Children covered by HMOs have a payment-to-age index of 0.5 indicating that their share of total payments is about one-half the expected amount based on their number of patients. This index in HMO FFS is also 0.5 for young children and 0.6 for older children. The youngest adults (18-34) also account for proportionately less services and payments than their patient share in both non-HMOs and HMO FFS.

TABLE 5
DISTRIBUTION OF TOTAL SERVICES, PAYMENTS, AND WORK RVUs - 1998

Age Group	Age Distribution	Ratio of Services Distribution to Age Distribution	Ratio of Payments Distribution to Age Distribution	Ratio of Work RVUs Distribution to Age Distribution	Age Distribution	Ratio of Services Distribution to Age Distribution	Ratio of Payments Distribution to Age Distribution	Ratio of Work RVUs Distribution to Age Distribution
	PRIVATE NON-HMO				**PRIVATE HMO FFS**			
< 1	%1.3	1.1	1.2	1.2	%2.1	1.3	1.2	1.3
1-9	13.2	0.6	0.5	0.5	16.2	0.7	0.5	0.5
10-17	10.8	0.6	0.5	0.6	11.4	0.7	0.6	0.6
18-34	21.6	0.8	0.9	0.9	24.4	0.8	0.9	1.0
35-44	19.8	1.0	1.0	1.0	20.4	1.0	1.1	1.1
45-54	19.4	1.3	1.3	1.2	16.1	1.3	1.3	1.3
55-64	13.9	1.5	1.6	1.6	9.4	1.6	1.7	1.7
Total	**100.0**	**1.0**	**1.0**	**1.0**	**100.0**	**1.0**	**1.0**	**1.0**
	MEDICARE NON-HMO				**MEDICARE HMO FFS**			
65-74	%42.2	0.9	0.9	0.9	%63.4	1.0	1.0	1.0
75+	57.8	1.1	1.1	1.1	36.6	1.1	1.1	1.1
Total	**100.0**	**1.0**	**1.0**	**1.0**	**100.0**	**1.0**	**1.0**	**1.0**

Among the privately insured, infants and older adults account for shares of services, payments, and work RVUs that are disproportionately large. This is especially true of adults ages 55-64 whose shares of payments and work RVUs are 1.6 times greater than their patient share in non-HMOs and 1.7 above their patient share in HMO FFS. Among Medicare beneficiaries, the age-related findings are less dramatic. The oldest patients' (75 +) shares of services, payments, and work RVUs are just 1.1 times their patient share.

Utilization by Urban Status and Payer

For both the private and Medicare non-HMO populations, Table 6 shows that the average utilization of practitioner services varies according to the urban/suburban/rural status of the patient. Non-HMO practitioner utilization is lowest for patients who live in rural areas and highest for those located in urban areas. Among private non-HMO recipients, patients located in urban areas account for about one-fifth more services, payments and work RVUs than do rural residents. Utilization by suburban privately insured patients is much closer to that of their rural counterparts. Average payment, services and work RVUs of suburban residents are just 8, 4, and 3 percent greater, respectively than rural averages. Service intensity (mean RVUs per service) varies only slightly by urban status and is the greatest for urban residents at 0.76 followed by rural patients at 0.74 and lowest for suburban residents at 0.73.

TABLE 6
MEAN NUMBER OF SERVICES, PAYMENT, AND WORK RVUs PER RECIPIENT BY URBAN STATUS* AND PAYER - 1998

Urban Status	Private Non-HMO	Private HMO FFS	Medicare Non-HMO	Medicare HMO FFS
Mean Number of Services per Recipient				
Urban	13.6	7.9	36.4	14.5
Suburban	11.9	7.9	32.3	14.5
Rural	11.4	7.4	28.5	14.8
Mean Payment per Recipient				
Urban	845	588	2,029	1,211
Suburban	755	563	1,698	1,109
Rural	701	541	1,514	1,090
Mean Work RVUs per Recipient				
Urban	10.27	7.65	29.37	15.12
Suburban	8.71	7.51	26.02	14.63
Rural	8.44	7.28	23.57	15.17

*URBAN STATUS

Urban	Suburban	Rural
Baltimore City, Montgomery, Prince George's, Baltimore County, Anne Arundel, Howard, Harford	Calvert, Carroll, Frederick, Charles, Queen Anne's, Cecil, Washington, Allegany	St. Mary's, Wicomico, Talbot, Caroline, Kent, Somerset, Worcester, Dorchester, Garrett

Urban-rural and suburban-rural differences are more pronounced among Medicare non-HMO recipients with urban beneficiaries accounting for about one-third more payments and 28 percent more services compared to their rural counterparts. Practitioner use by suburban Medicare beneficiaries, while being well below urban utilization rates, is still about one-eighth above rural payment and service averages. Service intensity variation related to urban status is different for non-HMO Medicare recipients compared to the privately insured. At 0.83, the service intensity is greater for rural residents but the same at 0.81 for both urban and suburban residents.

The possible reasons for these urban-rural differences in practitioner utilization by non-HMO patients include geographic differences related to the availability of practitioners, with supply, specialty mix, and ease of access being greatest in urban areas, less in suburban areas, and least in rural areas. Also, because of the different practitioner mixes in rural areas, services such as tests and imaging, are more likely to be provided by hospitals than in urban/suburban areas. Patient characteristics are another potential source of these differences with rural residents possibly less willing to seek care. The slightly higher service intensity for Medicare rural beneficiaries could result from fewer contacts for more routine/preventive care services. Medicare capitation rates, which are

developed at the county level based on expenditures under the traditional program, show the same general influence of urban status on utilization. The Commission found that similar patterns of utilization existed for urban and rural beneficiaries in its analysis of 1997 services.[4]

The FFS practitioner utilization by HMO recipients shows much less variation by patient location. However, since the data in Table 6 does not include capitated care, this difference between HMO vs. non-HMO may be a consequence of the limited set of HMO data. HMOs are more likely to capitate services in urban areas than in rural areas so the proportions of services excluded from this analysis because the services were capitated is likely to be highest for urban patients. The omission of capitated data may also explain the higher service intensity of HMO FFS compared to non-HMO services as discussed in the preceding section.

Among HMO FFS recipients, privately insured patients in urban and suburban areas have payments that are 9 and 4 percent higher, respectively, than payments for rural patients, and service use that is 7 percent greater than for their rural counterparts. As in private non-HMO patients, service intensity is lowest for suburban patients at 0.95, but unlike the non-HMO findings, service intensity is greater for rural patients, 0.98, than for urban patients, 0.97. In Medicare HMO FFS, mean payments for urban and suburban patients are 11 and 2 percent higher, respectively, than the rural average. But with regard to both service and work RVU utilization, rural patients have the highest rates.

Service Use Related to Medical Conditions

It is important to understand the types of diagnoses and conditions that cause patients to seek medical services and how these differ by payer category. Table 7 presents a summary of twenty-four diagnostic categories and conditions that necessitated practitioner services.[5] These summary categories are based on 182 Expanded Diagnostic Clusters (EDCs), which are shown in Appendix C. The EDC grouping system was developed at the Johns Hopkins School of Public Health and provides a convenient tool to group diagnoses into a manageable number of categories for analysis and presentation purposes. In this analysis section, results for the non-HMO and HMO FFS settings are discussed together, first for the private payers and then for Medicare.

[4] Health Care Access and Cost Commission. *Geographic Variations in Practitioner Expenditures and Utilization,* April 1999. This analysis did not include a suburban category.

[5] The set of diagnoses used in the analysis included up to three codes per service codes. Tests and imaging services were excluded from the analysis since these may have "rule out" diagnosis codes listed.

TABLE 7
DISTRIBUTION OF DIAGNOSES* IN PRACTITIONER SERVICES BY EXPANDED DIAGNOSTIC CLUSTERS (EDCS) AND PAYER - 1998**

EDC Category	Private Non-HMO	Private HMO FFS	Medicare Non-HMO	Medicare HMO FFS
General Complaints	%2.2	%2.3	%3.1	%3.4
Examination and Screening	10.4	15.2	5.8	7.1
Common Surgical Conditions	3.1	3.9	2.3	3.2
Skin Conditions	6.0	6.4	5.8	3.9
Disorders of the Mouth	0.2	0.1	0.1	0.1
Cardiovascular Conditions	4.9	4.3	21.2	20.1
Developmental and Genetic Disorders	0.2	0.3	0.0	0.0
Ear, Nose, Throat Problems	7.6	6.8	1.6	1.8
Endocrinologic/Metabolic Conditions	4.1	3.5	10.4	8.6
Gastrointestinal Conditions	3.2	3.8	4.1	4.5
Blood Diseases	0.5	0.7	2.3	1.9
Infectious Diseases	0.8	0.9	0.2	0.2
Neurologic Conditions	4.3	3.9	4.5	4.7
Pregnancy & Conditions of the Female Reproductive System	4.3	6.0	0.8	0.9
Cancer	2.8	3.3	6.0	9.8
Ophthalmologic Disorders	2.1	2.1	5.3	3.4
Orthopedic Problems	26.7	20.7	10.6	12.7
Facial and Skin Reconstruction	0.7	1.1	0.9	0.8
Psychosocial Problems	6.5	5.3	3.4	1.1
Pulmonary Conditions	6.2	5.9	5.8	6.3
Rheumatologic Conditions	0.9	0.9	1.3	1.2
Urinary and Kidney Conditions	2.0	2.2	4.1	3.9
Allergic Reactions	0.3	0.3	0.1	0.1
Poisoning	0.1	0.2	0.1	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**

*The set of diagnoses assigned to EDC categories used up to three unique ICD-9 CM diagnosis codes for each practitioner service, excluding tests and imaging services.
**Source: Christopher B. Forrest, MD, PhD, Health Services Research and Development Center, Johns Hopkins School of Public Health, July 30, 1999.

Although the diagnostic patterns associated with private non-HMO and HMO FFS practitioner services are similar, some differences are notable. For both patient populations, the four most frequent diagnostic categories account for one-half of the diagnoses examined and the top seven categories contain two-thirds of the diagnoses. Most of the top seven categories are the same for both patient groups, but examination and screening and pregnancy and conditions of the female reproductive system are 1.5 and 1.4 times more common, respectively, among the HMO FFS services relative to non-HMO services. In the non-HMO top ranked categories, orthopedic problems and ear, nose and throat problems are 1.3 and 1.1 times more likely, respectively, than in the

HMO FFS data. Other diagnostic categories that are more common in non-HMO practitioner services, compared to HMO services, include psychosocial problems (1.2 times more common), and cardiovascular and neurological conditions (each 1.1 times). Diagnostic categories more likely to occur in the HMO FFS services include common surgical conditions (1.3 times), gastrointestinal conditions (1.2 times), cancer (1.2 times), and facial and skin reconstruction (1.6 times).

Differences also exist between private non-HMO and HMO FFS services in the mix of diagnoses that comprise the main categories. (See Appendix C.) For example, within pregnancy and conditions of the female reproductive system category, diagnoses for uncomplicated pregnancy are equally likely in both non-HMO and HMO services. But compared to non-HMO services, HMO services are 1.7 times more likely to be related to contraception and about 1.2 times more likely to involve either pregnancy and delivery with complications, female genital symptoms, or abnormal pap smears. Conversely, the probability of menopausal symptoms in this category for non-HMO patients is twice as great compared to HMO FFS patients with endometriosis, female infertility, ovarian cyst, and utero-vaginal prolapse each 1.4 times more likely.

Some of these differences in diagnoses in the privately insured – such as the higher percentages for examination and screening in HMO services and the greater likelihood of cardiovascular conditions in non-HMO services – may be attributed to the younger age mix of the HMO patient population. Pregnancy-related conditions might be more common in the private HMO FFS patients due to a preference for HMO enrollment during pregnancy since patients incur fewer out-of-pocket expenses in an HMO setting. Some differences undoubtedly result from the more specialized nature of the HMO FFS services, e.g., likelihood of diagnoses for common surgical conditions and cancer.

The significant differences between the diagnosis distributions of the privately insured and Medicare patient populations result from the age differences. As with the privately insured, the top seven diagnosis groups account for about two-thirds of all practitioner-related Medicare. But the most frequent diagnosis among Medicare services is cardiovascular conditions. It accounts for about one-fifth of the diagnosis codes in each of the Medicare patient populations making it four to five times more common relative to the privately insured. Endocrinologic/metabolic conditions and cancer diagnoses are also far more common in the elderly, while orthopedic problems, examination and screening, and ear, nose and throat problems are less likely to be associated with practitioner use in the elderly than in younger privately insured patients.

Even when the diagnostic percentages seem similar between the privately insured and Medicare patient populations, the mix of diagnoses within the category is likely to differ. (See Appendix C.) For example, in both private and Medicare non-HMO services, about 6 percent of the diagnoses are for skin conditions. In the privately insured, the majority are due to dermatitis and eczema, acne, contusions and abrasions, warts and non-fungal skin infections. In Medicare non-HMO patients, the majority of skin diagnoses are for dermaphytoses, skin keratoses, and non-fungal skin infections. Another example is neurological conditions where nearly half are related to

cerebrovascular disease in Medicare non-HMO services, while neuropathy and neuritis and headaches together account for nearly 70 percent of this category in private non-HMO services.

Delivery system differences, i.e., non-HMO vs. HMO, in the diagnostic patterns observed in the Medicare services can be attributed to both the more specialized nature of HMO FFS services and the younger age distribution of Medicare HMO patients. As in the privately insured, diagnoses of cancer, examination and screening, gastrointestinal conditions, and common surgical conditions are all more common in Medicare HMO FFS patients (by factors of 1.6, 1.2, 1.1, and 1.4 times, respectively). But unlike the private sector, Medicare orthopedic problems and pulmonary conditions are more common in the HMO FFS setting.

Conclusions

Comparisons by age group show many expected age-related patterns. In private (non-elderly) patients, above average service utilization occurs for newborns and older adults. Adults ages 55-64 have the highest average payment, number of services, and work RVUs per recipient. Children, and to a lesser extent the youngest adults (18-34), are below average in these same utilization measures. The relative difference between the age groups varies by utilization measure and is greatest for mean payment per recipient. Medicare recipients also demonstrate utilization that increases with age but the differences between those ages 65-74 and older beneficiaries (ages 75+) are less dramatic than the differences that occur between age groups of the privately insured. Interestingly, the relative increase in utilization for older Medicare beneficiaries compared to the 65-74 year old age group is considerably smaller than the jump in utilization from the privately insured ages 55-64 to Medicare recipients ages 65-74.

Service intensity (mean work RVUs per service) exhibits a different age-related pattern from the other utilization measures. However, the age-related patterns for this measure are not consistent across delivery systems. Among private non-HMO recipients, service intensity is greatest for young adults ages 18-34, probably due to the concentration of childbirth services in this age group. Service intensity is next highest for infants but is just about average for older adults 55-64. Like their non-HMO counterparts, service intensity in HMO FFS is greatest in young adults and lowest in young children. However, the service intensity for infants is below that of adults, regardless of age. No age-related difference in service intensity occurs for non-HMO Medicare beneficiaries although in HMO FFS younger beneficiaries have slightly higher service intensity than those age 75 and older.

Comparisons of payers across utilization measures show both expected and unanticipated results. Mean payment, number of services, and work RVUs are lower in the HMO FFS recipients compared to non-HMO patients, regardless of age group mainly because capitated HMO services are not included in the HMO data set. Compared to the privately insured, elderly Medicare recipients average 2.7 times more services, 2.9 times more work RVUs, and 2.4 times greater payments. Mean payment per work RVU is

greatest in the private non-HMO sector and lowest in the Medicare non-HMO setting. However, average service intensity is higher under both the private and Medicare HMO FFS delivery systems than non-HMO. Within each delivery system, service intensity in young adults exceeds that of Medicare beneficiaries, with the difference being greatest in HMO FFS.

An examination of the age distribution by payers (Table 5) suggests that HMO recipients are generally younger than non-HMO recipients within both the private and Medicare payment categories. In both delivery systems, children's shares of payments, services, and work RVUs is as little as one-half their expected share based on their patient representation. This finding quantifies the extent to which children are less expensive to treat than other age groups. Young adult (18-34) patients, in spite of their high service intensity, account for shares of payments, services, and RVUs that are less than their patient share. Conversely, infants and older adults – especially adults ages 55-64 – account for shares of payments, services, and work RVUs that are disproportionately large. Disproportionate utilization by older patients also occurs in Medicare but the difference is subtle.

Comparisons of average service utilization by urban status (Table 6) found the greatest differences among non-HMO recipients. Private non-HMO patients residing in urban areas use about one-fifth more payments, services, and work RVUs than do their rural counterparts. Private non-HMO suburban patients also consumed more of these utilization measures than rural patients, but the differences ranged from just 3 to 8 percent. The influence of urban status on utilization is more pronounced among Medicare non-HMO patients. Likely sources of this geographic variation in utilization are differences in the availability of practitioners and in patient characteristics, including a beneficiary's willingness to seek care. Practitioner utilization by HMO FFS patients shows much less variation by patient location, but this may be an artifact of using HMO data that does not include capitated services. Differences in service intensity exist by patient location with suburban patients apt to receive services of slightly lower intensity than urban or rural patients.

The mix of diagnosis codes associated with practitioner services demonstrates payer differences that result from both age differences in the patient populations and the specialized nature of HMO FFS services. The distribution of diagnoses among the Expanded Diagnostic Clusters (EDCs) also points out the greater importance of pregnancy and delivery in practitioner use among private HMO FFS patients compared to their non-HMO counterparts. Although some of the difference may be age-related, it is also possible that the privately insured have a preference for HMO enrollment during pregnancy since less out-of-pocket spending is required in the HMO setting. This inference is supported by the finding that pregnancy and delivery with complications is a more common pregnancy-related diagnosis in the HMO setting suggesting that women who need more care and will incur higher out-of-pocket spending are especially likely to choose HMOs.